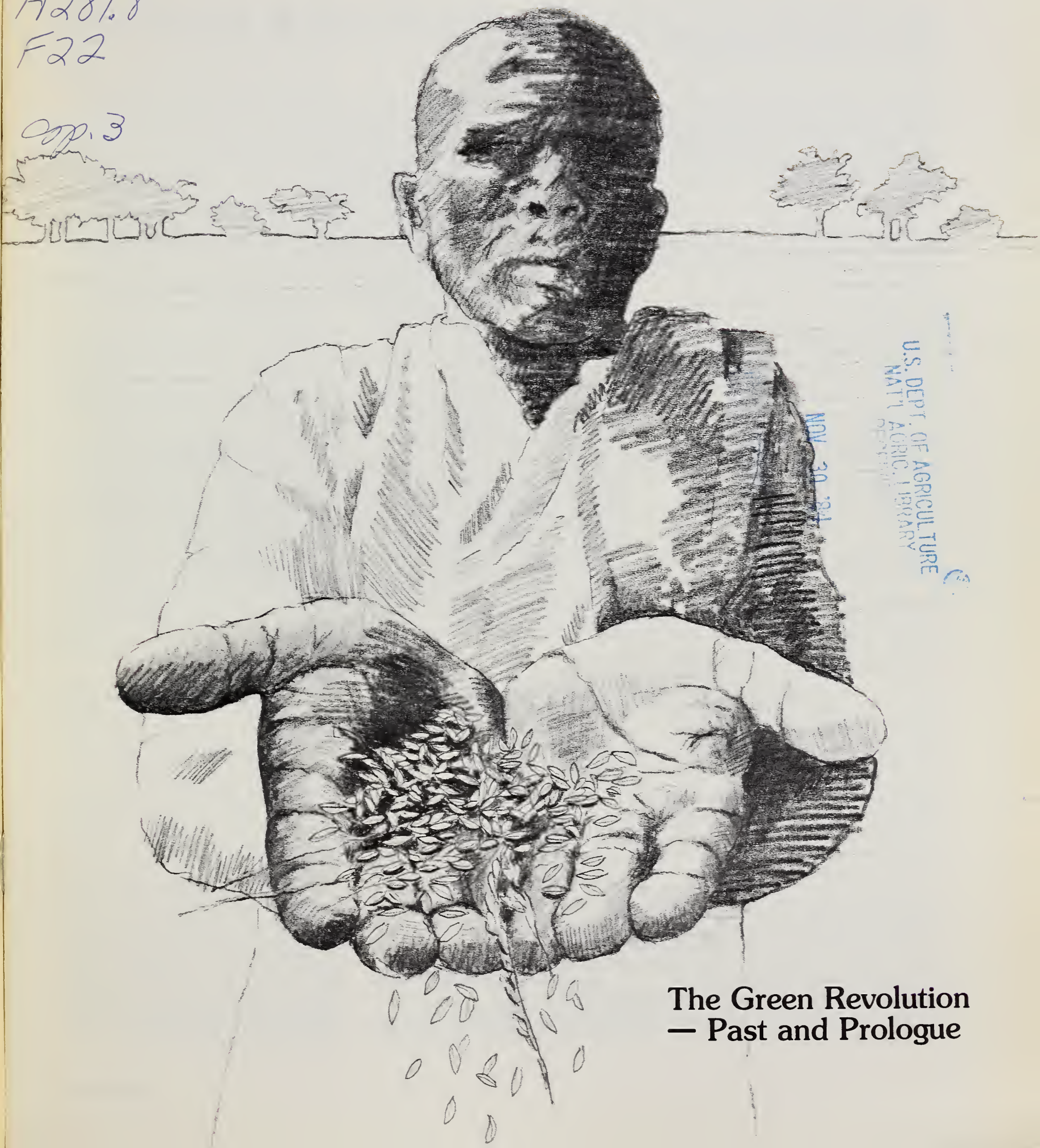
THE FARM INDEX

U.S. Department of Agriculture June 1976



The Green Revolution — Past and Prologue

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The Farm Index is published monthly by the Economic Research Service, U.S. Department of Agriculture. June 1976. Vol XV. No. 6
Readers are invited to write for the research materials on which we base our articles. Address queries to The Farm Index, Rm. 1664, Economic Research Service, U.S. Department of Agriculture, Wash., D.C. 20250. Please cite article titles when ordering.

Outlook

Economists are sticking to their earlier forecasts of slower advances in retail food prices this year. The way it looks now, retail prices for all of 1976 may creep up only 2 to 5 percent, depending on crop and livestock developments at home and abroad plus the pace of the economic recovery now underway.

Outlookers emphasize that their May forecast was made when many major crops were being planted. And needless to add, no one can predict what weather will be like in the crucial growing and harvesting seasons.

Still, it's a good bet retail food prices this year will easily trail the 1975 gain of 8½ percent. Even if prices rise 5 percent, this would be much less than the increases slated for most industrial goods and nonfood items.

In the short-term outlook retail food prices may inch up 1 or 2 percent during July-September. Beef and veal will lead the way, since supplies will be seasonally smaller than the record output of the first quarter.

Seasonal price hikes for fresh fruits and bigger tags for coffee and fishery items will also add to overall price strength. But, ERS economists figure that the increases won't be as steep as last summer's.

By fall, larger meat supplies and seasonal price declines for several crop-food items may bring some softening in average retail food prices. If this happens, food prices at the end of 1976 may average about 2 percent above the last quarter of 1975.

The marketing spread in 1976 may average from 4-6 percent above 1975 depending on movements of farm prices and the cost push created by inflationary forces in the economy.

Spreads for the market basket of farm foods will likely recover to their first quarter level between now and September and continue to widen in the last months of the year.

Unlike last year, increased spreads for animal products in 1976 will contribute more to wider spreads in the market basket than crop products. Spreads for crop products, also entering the year at near record levels, are expected to continue to increase gradually during 1976 in response to higher material and labor costs of food marketing firms.

The Green Revolution — Past and Prologue

The green revolution—the developing world's switchover from traditional varieties of wheat and rice to new high-yielding strains—lost some momentum last year.

A new ERS study reveals that although the area planted to high-yielding varieties of wheat and rice is still increasing, the rate of expansion has slackened from what it was a few years back . . . probably the result of 1974/75's fertilizer shortage.

In the non-Communist nations of Asia and the Near East—and they account for nearly all the high-yield grain planted in the developing countries—total area put to the "miracle" varieties grew 8 percent in 1974/75, surpassing the 100-million-acre mark for the first time. But the gain was less impressive than in both 1972/73 and 1973/74, when the area shot up 18 percent each year.

Is the green revolution beginning to run its course? Not necessarily.

Less land to till. It's true that some countries can expect further dropoffs in the rate of adoption of the new grains as the amount of additional land suitable for cultivation diminishes. Other essential ingredients for maximum yields include good water control and ample supplies of fertilizer, and many nations are strapped to provide them—despite the decline in fertilizer prices from their 1974/75 peak.

However, the ERS study emphasizes that new varieties are being developed for a broader array of environmental conditions. These could greatly widen the potential for spreading the green revolution.

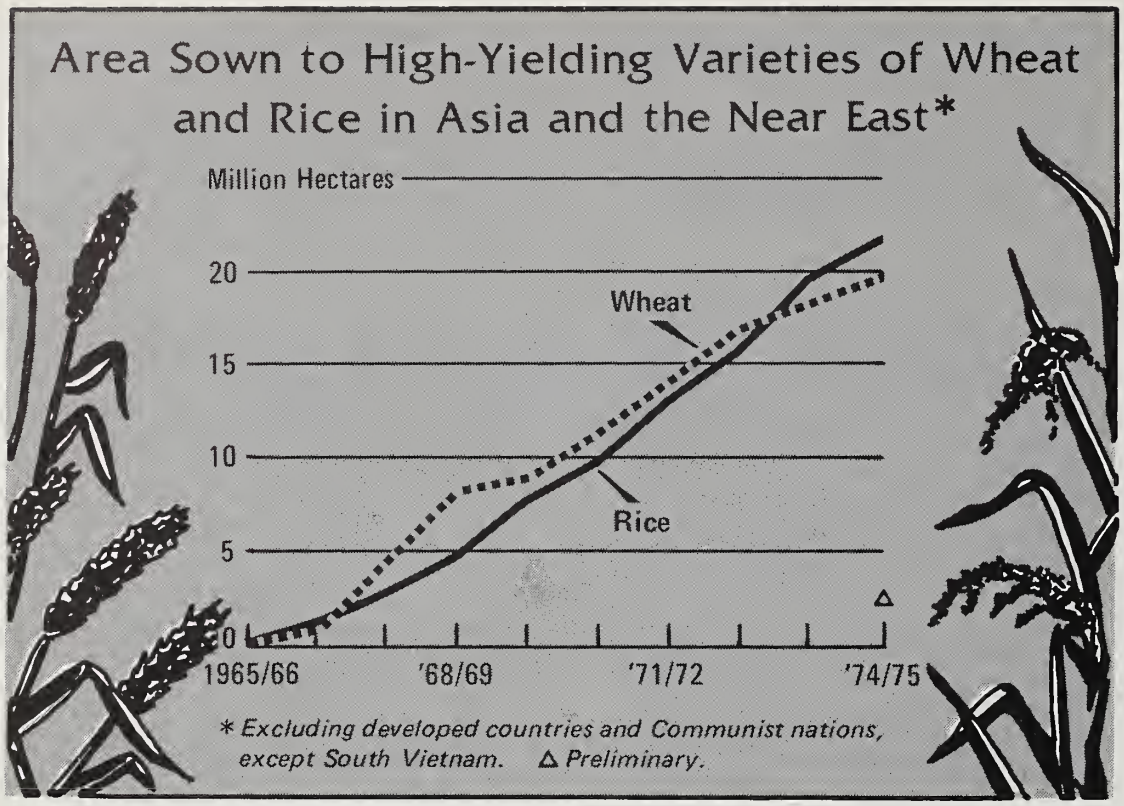
Perhaps the fate of the green revolution ultimately lies with the people who started this movement in the first place.

Research to the fore. If the green revolution in wheat and rice is to continue at full steam, it will depend heavily on the work of two international agricultural research institutes: the International Wheat and Maize Improvement Center (CIMMYT) in Mexico, and the International Rice Research Institute (IRRI) in the Philippines. Virtually all the strains of high-yielding wheat and rice grown in the less developed countries were either developed at one of those institutes, or were adapted locally from CIMMYT or IRRI varieties.

Several characteristics of the high-yielding grains developed at CIMMYT and at IRRI have helped those grains to boost food production in the developing world over the past decade. The new ERS study on high-yielding wheat and rice in the less developed countries concentrates on the "semi-dwarf" varieties—those with short, stiff stalks, high responsiveness to fertilizer, and an ability to mature more rapidly than traditional varieties. The semi-dwarfs respond well to added inputs of fertilizer with increased yields, rather than growing tall and toppling over, as traditional varieties would tend to do.

New strains. Haldore Hanson, director general of CIMMYT, points to the strides his organization is taking toward further development of high-yielding strains of wheat and maize—strains that can flourish in areas where grain production has had real difficulty in the past. "There is no question that within the 1970's we will have a greatly improved varietal distribution," Hanson said in a recent interview.

He cites strains being developed that will contain better resistance to septoria, a fungus-like disease especially deadly to crops in the Mideast, North Africa, and South America. Hanson is excited about the discovery by scientists at CIMMYT and Oregon State University of a



technique to determine how well cereal seedlings can tolerate aluminum toxicity in the soil. This advancement, he contends, will be crucial to the expansion of foodgrain plantings in regions such as Brazil, where unusually high aluminum levels limit the area that can be sown to grains.

Hanson points to progress CIMMYT is making toward the development of strains of wheat that are unusually tolerant to drought, and to their importance under conditions such as those in Turkey, where irrigation is minimal and yields vary tremendously depending on rainfall.

Triticale likes it cold. Another breakthrough at CIMMYT is the development of triticale, a cross of wheat and rye. The new strain is resistant to rust and septoria, can withstand drought and soil acidity, and, perhaps most significantly, is tolerant to cold. That tolerance could be a major factor in expanding grain plantings to the mountainous areas of India, Pakistan, Ethiopia, and Kenya where earlier attempts with bread wheats have been disappointing.

Tubewell irrigation in India — essential to maximize yields.

Miracle (IR-8) rice being transplanted in the Philippines.

Can triticale substitute for bread wheat in the developing countries? Hanson points to taste tests CIMMYT has monitored in which loaves of bread or local foods such as chapadis and tortillas baked from triticale were judged not only as good as those baked from bread wheat, but sometimes better. Though the commercial acreage planted to triticale worldwide is still rather small, Hanson predicts substantial use by 1980.

Long history. The ERS study states that the semi-dwarf varieties in current use, though considered by some to be revolutionary in their impact, are actually the product of a long evolutionary and developmental process.

Semi-dwarf wheats date back to the 1800's when they were first recognized in Japan. One Japanese strain found its way to Italy and another to the U.S. where it was improved through further breeding, and arrived in Mexico in the early 1950's. There it was combined with other varieties by Norman Borlaug and his associates at CIMMYT to form the high-yielding varieties that were the basis of the

Farmer spraying field of high-yield wheat variety.

Winnowing high-yield rice in Central India.

green revolution. Borlaug, who began his work in Mexico in 1944 and has been with CIMMYT since its inception in the mid-1960's, was awarded the Nobel Peace Prize for his efforts in 1970.

Early-maturing rice varieties date back even further—to 1000 A.D. in China. The parent of high-yield varieties of rice developed at IRRI today are strains that were bred over the years in China, Taiwan, Indonesia, and Bangladesh.

Poor farmers left behind? One objection to the spread of high-yielding grain has been voiced since the outset of the green revolution. Some critics contend that—because high-yielding varieties require relatively high levels of fertilizer and water for maximum yield—the many small, poor farmers of the developing world are being left behind.

A United Nations study of the socio-economic impact of the introduction of high-yield foodgrains noted in 1974 that where serious inequalities already exist—and resources are not abundant—the technological advances for increased agricultural production may be limited to "those who have superior endowments of land and social status, to the exclusion of the poorer majority." The report urged government to adopt policies "to deal with this fundamental issue."

Fertilizer a key. CIMMYT director Hanson says that "the most widely adopted high-yielding varieties are outyielding traditional varieties at all levels of fertilizer application" but the margin at zero levels of fertilizer input is generally only very slight. At optimal levels of fertilizer, high-yield varieties have been known to outyield traditional ones by as much as 300 percent.

Do the high-yield grains hold the answer to the long-range problem of world hunger? Hanson thinks so. He and his scientists are certain that "CIMMYT can provide the technology for increases in food production if governments are willing to supply the policies."

Great potential. Hanson says that even without expanding acreage, the world can double its food production by the year 2000, to match the expected doubling of its population. For as impressive as the green revolution has seemed, it has actually affected only a small part of the food producing regions of the developing world.

The International Wheat and Maize Improvement Center (CIMMYT) in El Batan, Mexico. Wheat varieties developed here helped generate the green revolution.

The International Rice Research Institute (IRRI) in Los Banos, Philippines. Most of the world's semi-dwarf rice varieties originated at this center.

High-yielding varieties comprise more than 25 percent of the total acreage of wheat or rice in only a handful of the less developed nations. As noted in the ERS study, high-yielding wheat accounts for 38 percent of all the wheat planted in the less developed nations of Asia and the Near East, and high-yield rice for 26 percent in the same countries, with traditional varieties still comprising most of the remainder.

Governments must cooperate. The further spread of high-yield grains will probably be costlier than the initial introduction in most areas, as the most suitable land is used up and resources become more scarce. But Hanson insists that if governments are willing to produce the fertilizer and provide the water, the technology will exist to enable food production to keep pace with population growth.

"Our role is scientific, not political—we can't make policy," Hanson says. He hopes to see the reversal of an apparent trend over the past 25 years, whereby "governments seem to be willing to take action only in the face of hunger, rather than dealing with the long-range aspects of the food problem."

Paying the price. Admittedly, the cost of added inputs of fertilizer and water will drive up the cost of food production—a development that appears to be inevitable. But it also appears that high-yielding varieties of foodgrains have strong potential as a solution to the problem of world hunger, as long as the world is willing to pay the price.

[Based on *Development and Spread of High-Yielding Varieties of Wheat and Rice in the Less Developed Nations,* by Dana G. Dalrymple, Foreign Development Division, and special material from Haldore Hanson, director general of the International Maize and Wheat Improvement Center.]

The Ins and Outs of Buying Farmland

To buy or not to buy farmland—that is the question. And if to buy, is now the time? More than rhetoric, this problem is often a difficult one as farmers (and would-be farmers) weigh the merits of buying or leasing farmland.

The optimists on the one hand say that land just has to be a good buy since there's only so much to go around for so many people—an increasing population at that. And to back up their position, they point to the nearly continuous rise in farm real estate values since 1933.

The more cautious investors contend that farmland is overpriced in relation to its earnings potential. They argue that land should not be bought until either its price drops or its money-making potential improves. Moreover, they rightly point out that there's no guarantee that land values will keep rising.

National averages. Although both viewpoints have merit, they overlook the fact that trends in land prices and price-earning ratios are based on national averages. Therefore, regional or local deviances are hidden. Also, the individual farmer's situation is not taken into account.

As can be imagined, the prospective buyer's circumstances—such as his financial resources—figure heavily in any buying decision. In addition to money on hand or capital assets, other big factors are: producer and managerial abilities, debt repayment capabilities, levels of aversion to risk, short- and long-term land ownership goals, and alternative uses for available funds.

Cautious figuring. Assuming, however, that the buyer is adequately financed and is or will be a reasonably efficient farmer or landlord, the present time appears to be reasonably favorable for buying farmland. Still, though, a little cautious figuring before the deal is closed is definitely wise.

The first maxim to keep in mind is that farmland has value primarily because it is capable of generating income. Of course, land offers other benefits such as a sense of independence and security in owning a chunk of the earth, but the prime consideration should be financial.

And financial consideration goes far beyond the price tag. It involves projecting into the future expected annual net income from the land—a not so easy chore, particularly in light of recent cost-price squeezes and uncertainty over the future cost of environmental controls on agriculture.

Shrinking dollar. Also, a discount rate must be figured into the projected income over the years, as the longer you have to wait to get that income the less it is worth to you today. For example, compare the worth—purchasing power—of today's dollar against one in 1950.

There's a mathematical equation—the income capitalization formula—that is based on this shrinking phenomenon of a constant dollar. The formula is simply $v=a/r$, where "a" is annual net land income, "r" is the discount or interest rate, and "v" is the resulting implied value of the land.

Use of the formula can help you determine a tract of land's breakeven price. Assume you have your eye on a tract with a projected constant annual net earning power of $100 per acre. Figuring to keep the land indefinitely and that the discount rate should be 8 percent a year, the breakeven price would be $1,250 per acre.

Premium prices. If this is more than the going market price, don't despair. Most land—regardless of the location—appears to be selling at a premium these days. That is, the asking price exceeds the present value of the anticipated income stream.

One angle the formula doesn't take into account is the price appreciation potential—a big factor in recent years with zooming farm real estate values. Particularly if the land is in an area where there is a strong demand for add-on tracts or where there are urban or other nonagricultural pressures, land holding can be a good investment in itself.

Investment pitfalls. The lure of land appreciation can turn into a pitfall, though, if the situation is not realistically appraised. For example, if the land's earning power is too low—even if anticipated appreciation is high—the inbetween years can be financially lean ones.

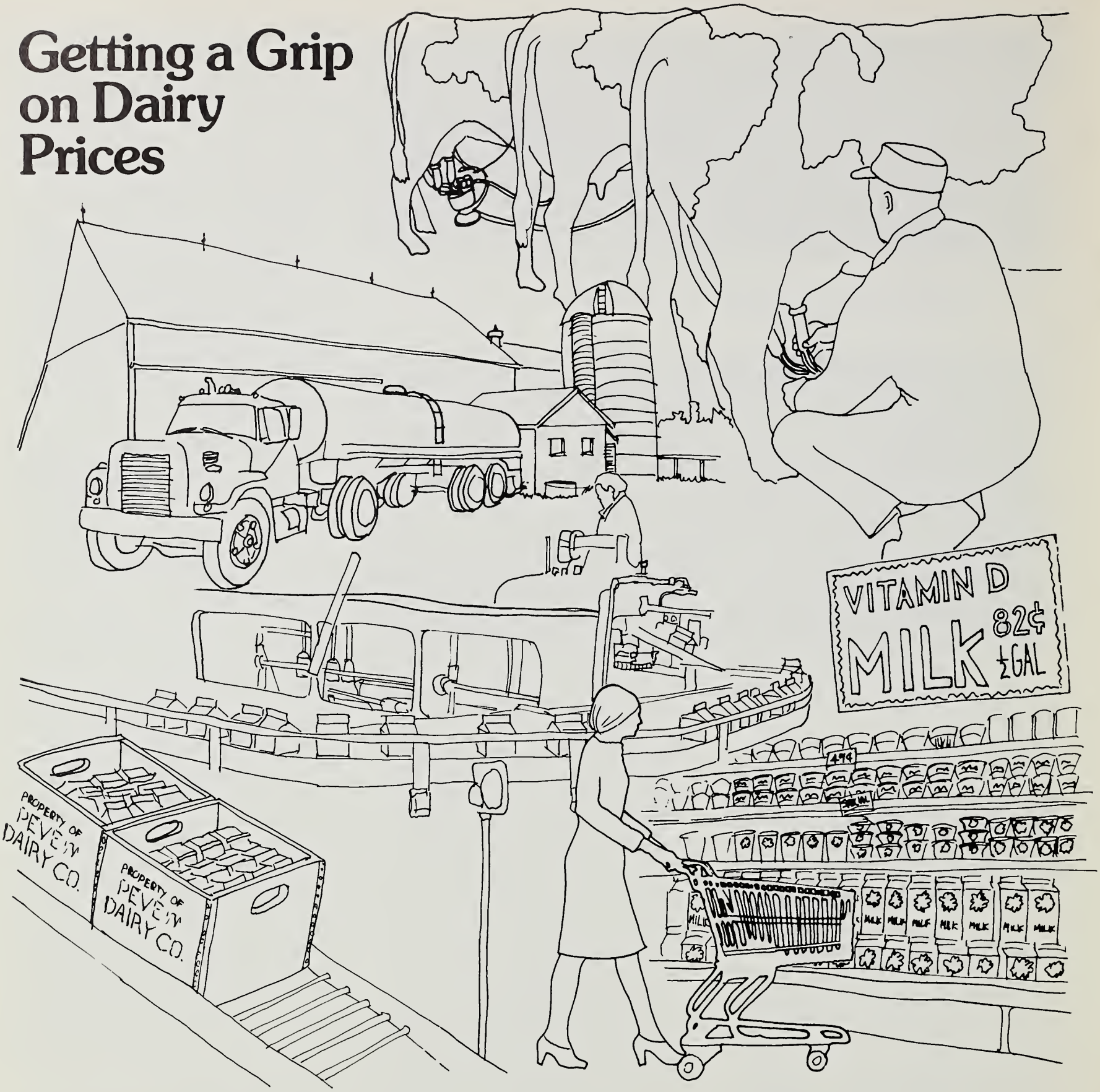
Another factor to consider is that land appreciation is not certain, even though the near future looks optimistic. A possible cloud on the horizon could be land use controls such as measures to keep prime land in agricultural production. These controls would preclude or at least complicate the sale of farmland to urban, industrial, or recreational buyers—those usually most willing and financially able to pay premium prices.

Leasing alternative. If all these "ifs," "ands," and "buts" about buying farmland are just too much for you or if you're short on initial capital, don't give up—you might want to consider leasing. Leasing has its drawbacks in that you don't share in land appreciation and you might run into a nonrenewable contract, but it also has its good points.

The main advantage is that the cash flow from a leased tract may be more than that from an owned tract. Reason is that a tenant doesn't have to make mortgage or property tax payments.

[Based on speech, "Is Now a Good Time to Buy Land?," by William Crowley, Natural Resource Economics Division, at the Michigan Farmers' Week, Michigan State University, East Lansing, March 25.]

Getting a Grip on Dairy Prices



The American milk cow squeezed out an average of 10,354 pounds of milk last year in an utterly exhausting effort to quench America's thirst for dairy products.

Few agricultural commodities can match milk in versatility of product forms or importance to the American diet—both taste-wise and nutritionally. Last year, each American consumed an average of 546 pounds of milk in fluid or processed form.

Yet, moving that milk from the dairy farm to the consumer in the product form that he demands is no easy task. A system of production, processing, marketing, and pricing has evolved that is so complex and delicately balanced that it may leave many consumers scratching their heads in confusion.

Maze in between. Most of this maze lies in that part of the system between the farmer and the consumer. The producer must accept returns based on market factors beyond his control, while the consumer must pay the

price marked on the container or forego the product.

To some degree, the effect of the system is seesawing. As the farmer receives a stronger financial return, the consumer pays more for the product. And, as the consumers benefit from lower prices, the farmer must accept lower returns.

Take 1975 as a good example. During the first half of the year, retail prices held steady as the farmer's production costs rose with inflation. Thus dairy farmers fared poorly for a period. Then, in the second half of the year, prices at stores strengthened sharply to give the farmer a healthy return as the consumer paid more.

Farmer's discomfort. During that first half of 1975, production costs climbed 12 percent above 1974 levels during the comparable period, while prices dipped 5 percent in comparison. It takes little economic knowledge to imagine the farmer's discomfort.

The seesaw dipped the other way in the second half of the year, as prices jumped to 15 percent above those in the last half of 1974, while production costs rose a modest 5 percent. All in all, it proved to be a moderately successful year for farmers after the sluggish start. Total cash receipts for farmers rose 4.6 percent above 1974 levels.

The ups and downs of the year also balanced out for the consumer, who paid an average of about 3 percent more for dairy products in 1975—well below the record 19-percent price jump in 1974.

Year-end jump. While the overall price increases for the year were modest, much of the increase came in the last 3 months, when retail prices rose 6 percent. The increases varied considerably between product forms. Milk prices edged up 4 cents per half gallon in the last 4 months, but the increase came after declines earlier in the year. As a result, the price was up only a tenth of a cent for all of 1975.

Among processed products, American cheese prices boomed by 26 cents a pound last year, compared with an 8-cent increase in 1974. Butter prices soared 38 cents a pound in 1975, while its competitor, margarine, declined by 15 cents a pound. In 1974, butter prices rose 8 cents a pound, while margarine increased 6 cents a pound over 1973 levels.

Consumers who cast a jaundiced eye at the dairy industry should, however, consider the relative performance of dairy items with other commodities:

- Average prices for all foods jumped 8½ percent last year, versus the 3 percent for dairy products.
- The Consumer Price Index shows that since 1967, all food prices advanced 75 percent, whereas dairy products went up 57 percent.

Bulk in the middle. As is the case with most agricultural industries, much of the dairy industry occupies that middle area between production and consumption, providing a pivot for the price situation.

The crux of the system is to move a highly perishable product in the proper mix of variable forms from the farm to the consumer. The system is further complicated by (1) seasonal production variations that don't mesh with demand variations and (2) by the necessity to not only offer the products at prices that consumers are willing to pay, but to return enough profit to the farmer to encourage adequate supply.

Many involved. This system involves dairy cooperatives, private enterprise, and Federal and sometimes State governments.

The cooperatives enter the picture early by providing tank trucks that collect milk from many of the 300,000 dairy farms every other day. Handling must be performed under strict sanitary conditions required by law to avoid bacterial contamination.

Depending on how strictly sanitary requirements are met, milk is classified as either Grade A, which can be used as fluid milk, or Grade B, which must be used for manufacturing. This is further complicated by the fact that not all of the Grade A output is needed for fluid products. The Grade A producer receives a "blend" price based on how much milk in the market was used for the higher valued fluid products and how much was used in manufacturing.

Stable prices needed. Because of the seasonal supply fluctuations, the industry learned long ago that some system was needed to stabilize prices, if a steady supply was to be attained. Wildly unstable prices would drive out many producers, and discourage production to the degree that, in the long run, the consumer would suffer.

So, with authority from Congressional legislation, USDA has become involved in dairy price stabilization for several decades.

The USDA's prime tool in stabilizing prices is the price support. Since 1949, Congress has stipulated that price supports must be designed to return a price to the farmer to achieve between 75-90 percent parity (ratio between milk prices to farmers and their costs, based on a historical period).

Support price system. The support price works this way: USDA calculates the price level needed so that farmers would receive returns at the desired parity level as determined by the Secretary of Agriculture.

The USDA's Commodity Credit Corporation then provides this price floor for manufacturing-grade milk by offering to buy butter, nonfat dry milk, and American cheese at prices which will allow the farmer to receive the announced support price for milk on a yearly basis, with some fluctuation during the year.

Federal marketing orders also play a major role by determining the minimum price for fluid-grade milk. This price is determined by using the Minnesota-Wisconsin (M-W) area manufacturing-grade milk prices as a base, then adding a set differential for specific market areas and transportation costs to different regions of the Nation.

Model market. The M-W price is used because it reflects prices in the area that produces the largest bulk of milk above local needs, and because it establishes a value for milk under open market conditions.

Competition for milk supplies among processors and bottling plants often keeps the actual prices paid to the farmer for manufacturing-grade milk above the "floor" set by the Federal price support program. States do not regulate manufacturing prices. This actual price for manufacturing use is then blended with the price for fluid use on a proportional basis to determine the price the Grade A farmer actually receives.

After the milk is bottled or processed, prices are determined by private enterprise in most States, as the Federal Government bows out of the pricing picture. In a few States, however, State authorities regulate retail and wholesale prices.

Retail prices vary. When the consumer enters the picture at the retail level, he may find considerable price variations for the same product on a given day. Geographic location, the nature of the retail outlet, and pricing by individual stores, all affect prices on the shelves. Many stores use dairy products frequently as "specials" to draw in customers. A careful shopper can often save by keeping abreast of retail variations.

Despite these retail price variables, most consumers may be well aware of the general price increase in recent months. Yet, in one respect the increases may be a blessing: They filter back to the farmer to encourage a production increase.

Farmers can control the flow of production by culling more or fewer cows, or varying the amount of concentrates fed to them to raise or lower production per cow, or expanding or getting rid of their herds.

Trim production. When prices drop and production costs rise, farmers tend to trim production costs and, in turn, production itself.

Fewer cows are needed now, anyway, due to improvements in productivity per cow in recent years. In 1969, about 12.3 million producing dairy cows were on farms. Last year, the number was down to 11.2 million. Meanwhile, milk production per cow rose from 9,434 pounds in 1969 to 10,354 last year.

Still another production factor is feed cost. From mid-1974 to mid-1975, high feed prices caused farmers to cut back on grain feeding, which spurs production. Last year's huge feed grain crop helped moderate the milk production costs.

The milk-feed price ratio, which measures pounds of concentrate ration equal in value to 1 pound of milk sold to plants, has risen from 1.25 in January 1975 to 1.75 in January 1976. This indicates that farmers can better afford to increase feeding.

Late 1976 outlook. Looking ahead to late 1976 prospects, the dairy farmer can afford to be a bit optimistic, while consumers may expect retail prices to advance moderately through the end of the year.

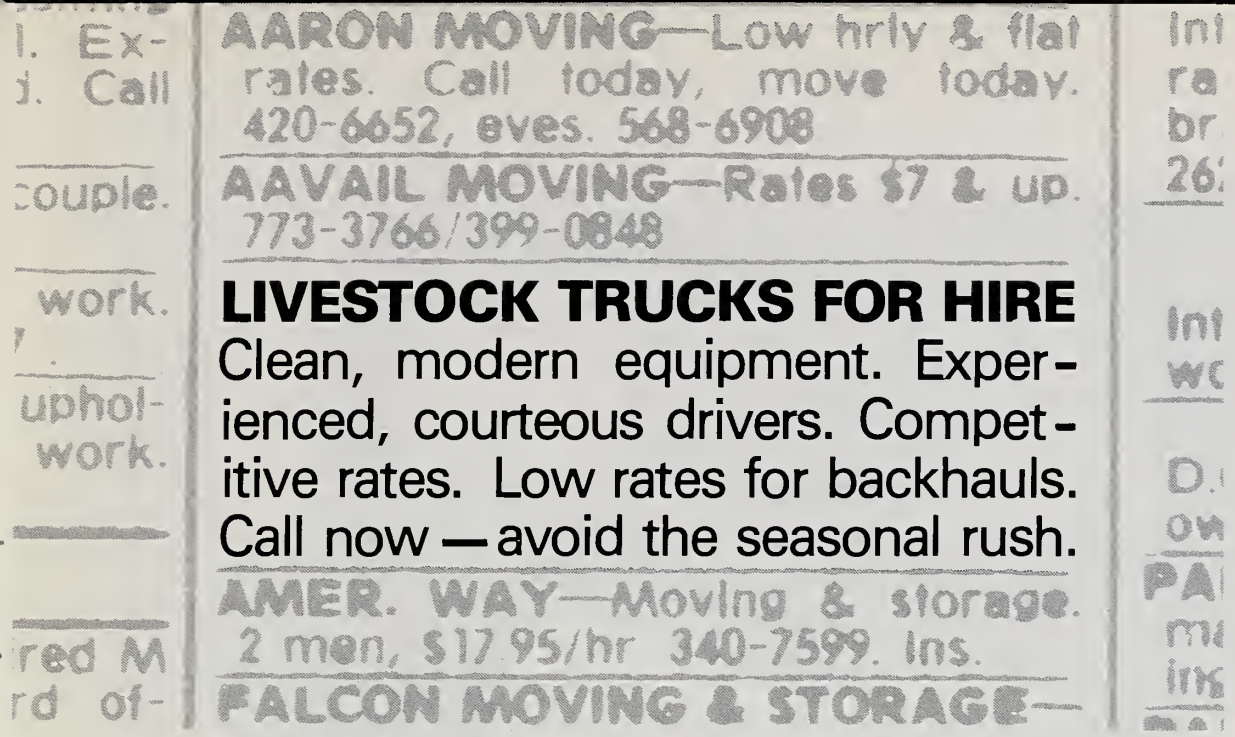
From a producer's standpoint, here's the outlook for the last half of 1976:

- Farm milk prices should remain well above 1975 levels during comparable last-half periods. Prices will be rising seasonally in the next few months.
- Support prices for milk increased 42 cents to $8.13 per 100 pounds—80 percent of parity—on April 1. Support prices will be reviewed quarterly.
- Production costs, other than feed, may continue climbing in the last half of the year.
- Overall, milk production should remain fairly strong during the year, with total production for 1976 expected to be 2 billion pounds over 1975 levels.

From the consumer's viewpoint, retail prices for all dairy products likely will rise 6 to 8 percent this year over the 1975 average. This compares with an average increase of 3 percent in 1975. However, the gain may be somewhat misleading because the 1975 price average was depressed by relatively low prices during the first half of that year. The consumer may have already shouldered the bulk of the increase.

[Based on the March and May 1976 *Dairy Situations* by James J. Miller and Charles N. Shaw, Commodity Economics Division.]

American dairy cows worked themselves to utter exhaustion by producing 10,354 lbs. of milk each last year.



Livestock truckers are doing a better job than their critics have given them credit for. At least that's the conclusion of an ERS study of the industry, which found little evidence that interstate regulation of for-hire livestock trucking would improve the economic performance of these firms.

The performance issue cropped up a few years ago when some livestock shippers charged there were serious problems in livestock transportation requiring corrective action. Their complaints included a lack of firm stability in for-hire trucking, seasonal shortages of equipment, poor quality of service, and rate discrimination of various types.

ERS examined the costs, rates, and operating characteristics of livestock trucking firms, and surveyed shippers and truckers about service quality and seasonal tie-ups.

Researchers found that many alleged problem areas either were not widespread or were related to the cost structure of the trucking firms. Also, they noted, some critics may not have fully considered the difficulties livestock truckers face in handling seasonal peaks in feeder cattle shipments.

Seasonal rush. Truckers reported considerable seasonality in their traffic. In 1973, for example, livestock shipments were 74 percent higher in October than in February.

Data from five major cattle feeding States also showed highly seasonal cattle movements. In Iowa, Nebraska, Texas, and California, inshipments of feeder cattle were much greater in the fall than during the rest of the year. Colorado's peak months were May, June, and October.

During the busy season a substantial number of shippers reported difficulties in getting enough for-hire trucks to ship their livestock. However, this apparently didn't prompt many to use their own trucks, since less than 20 percent of the cattle and calves moved in shipper-owned vehicles.

Generally, researchers found the level of equipment utilization to be quite good, considering the amount of seasonality in livestock shipments. The problem of occasional excess capacity for trucking firms and truck shortages when shippers want them most will probably persist as long as the present patterns of livestock marketing continue.

Cost factors. However, if seasonal peaks and troughs could be reduced, the firms could use their drivers and trucks more efficiently to keep costs down and possibly provide shippers with lower rates. For example, per-mile costs for a tractor and trailer driven 150,000 miles per year would be about 17 percent less than for those driven 60,000 miles per year. The savings would result from spreading fixed costs over a larger number of vehicle miles.

Trip length also affected the truckers' costs. The cost per mile tended to be quite high for short hauls, but as trips lengthened, per-mile costs decreased. However, for trips of 200 miles or more, costs per mile tended to be about the same regardless of the distance.

The firms' cost structure shed some light on another complaint as well—shippers' charges of rate discrimination. Distance traveled, researchers found, accounted for most of the variation in shipping rates. Since distance also affected trucking costs, economists felt there were rational reasons for some of the differences in rates truckers charged.

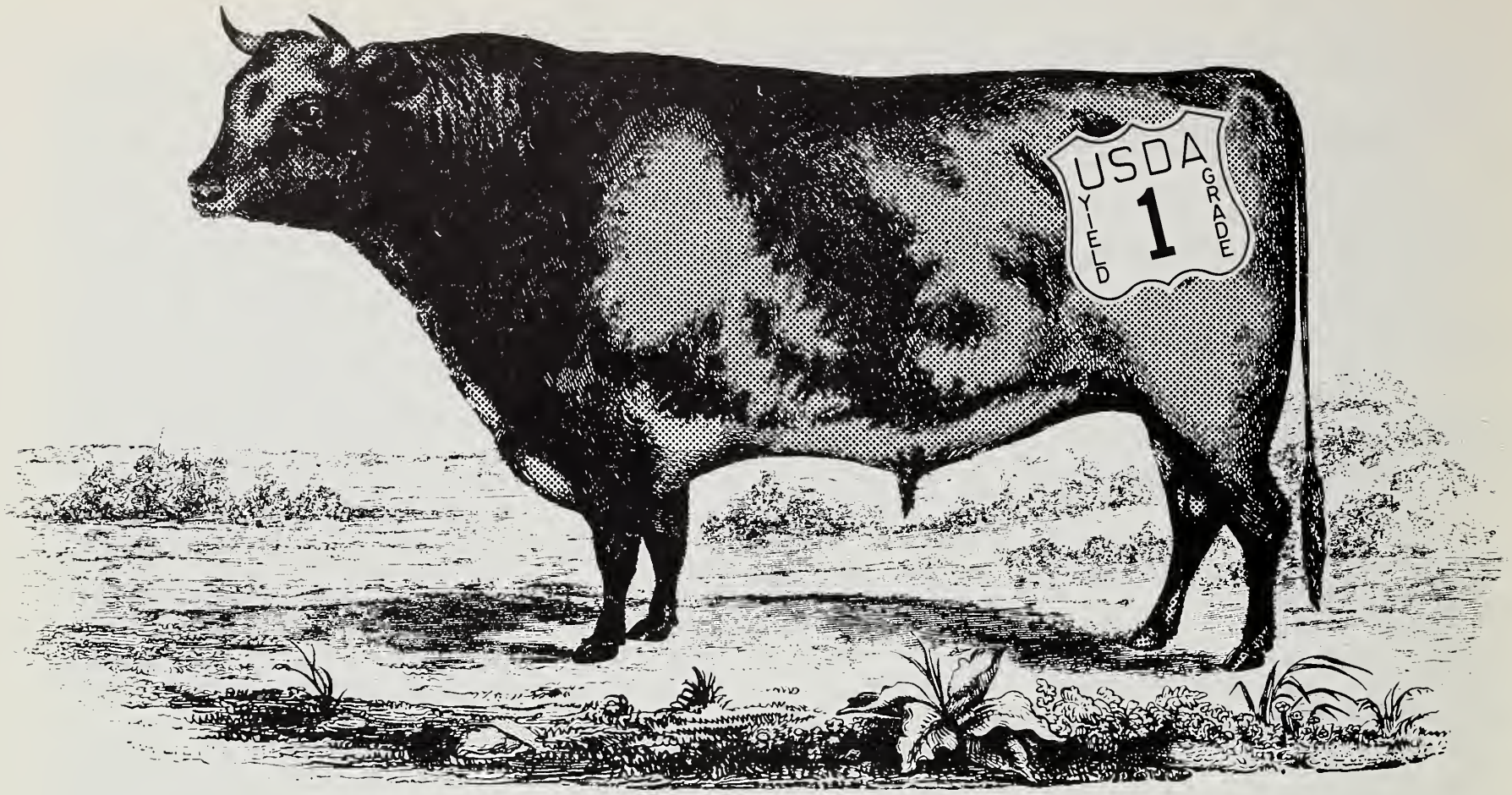
The backhaul situation. The issue of backhaul rates also related to trucking costs. Some shippers have criticized truckers for charging a lower backhaul rate than the rate for the initial haul. These rates did tend to be lower, but opportunities for backhauls were few, uncertain, and highly seasonal. However, partial or fully loaded backhauls tended to raise per-mile costs only slightly for longer trips. The additional expense over returning empty would be minimal, but efficient use of equipment would be boosted.

If they were readily available, backhauls could be beneficial to both truckers and shippers. In this case, truckers could possibly charge rates for both loads that were more closely in line and lower on the average. Without any backhaul assurances, though, truckers might find it necessary to offer reduced rates to obtain return loads.

High quality ratings. However, few shippers reported dissatisfaction with the quality of the service they were paying for. Death loss was insignificant, and more than 80 percent of the livestock handlers and 90 percent of the cattle feeders rated the animals' condition to be excellent or good at the end of the trip. Shippers were also generally complimentary about the attitude of trucking firms, promptness of service, drivers' skills, and quality of equipment used.

And contrary to some criticisms, livestock trucking firms do not appear to be highly unstable if length of time in business is any indication. On the average, firms had been around for more than 18 years, and more than 87 percent had been in business longer than 3 years.

[Based on "Economic Performance in Trucking of Livestock," by Patrick P. Boles, National Economic Analysis Division, paper presented at the Southern Agricultural Economic Association, Mobile, Ala., Feb. 1976.]



Grading the New Beef Standards

It's been a couple of months since USDA revised the beef grading standards. Odds are the average shopper hasn't detected any difference in the quality of beef at the supermarket. If that's so, then the proponents of the new system have made their point.

The whole idea behind the changes is streamlined efficiency in beef production that will, in time, save money for both the cattleman and the consumer. By the same token, consumers should be getting beef that's just as tender and flavorful as before the new grades went into effect on February 23.

The price of fat. USDA estimates that upwards of $2 billion a year is spent needlessly to produce, ship, and trim off excess fat from beef carcasses. The new system aims to eliminate this waste, while still delivering a top quality product.

The final judges of whether the meat sold under the new standards is as good as ever will be the beef eaters of America. If their reaction is anything like that of a USDA taste panel, the new grading standards are off to a running start.

The taste test was given at Kansas State University. No tyros when it comes to judging beef quality, all the panel members worked in some area of meat science or meat processing.

The primary object of the taste test was not to rate beef under the old and new grades (revisions were just in the proposal stage when the panel first met) but the experiment was set up in such a way that differences in palatability of beef graded under the two systems can now be measured.

"No appreciable differences." Reporting on the results, ERS and the Agricultural Research Service concluded: "No appreciable differences in tenderness or overall acceptability ratings were found between rib steaks graded Choice by the old standards and those graded Choice by the new standards. Thus, consumers buying Choice grade beef will not detect any lower quality."

The taste testing at Kansas wasn't done at a single sitting. The project was part of a continuing study. The data were collected over a 3-year period by the U.S. Animal Research Center at Clay Center, Nebraska, which designed and conducted the experiment. The animals were slaughtered at differing ages, since maturity along with marbling (flecks of fat within the lean) were key criteria for grading beef carcasses under the old standards.

By the time the taste test ended, the panel had sampled a total of 168 rib steaks, cut from 494 steer carcasses that had been selected from nearly 1,120 carcasses in the project.

Beef scoreboard. Participants scored the steaks for tenderness, juiciness, flavor, and overall acceptability. Choices ranged from 1 ("extremely undesirable") to 9 ("extreme-

ly desirable"). Generally, as the quality grade decreased from Prime, the top grade, to Standard, the lowest grade for beef from young animals, the palatability of the meat also decreased.

Significantly, however, all of the grades—whether Prime, Choice, Good, or Standard—got well over the minimum score of 5 ("acceptable").

This test serves to illustrate that rib steaks from young steer carcasses fed 200 days or more are very acceptable in palatability regardless of quality grade or quality grade system, the research team reported.

When all is said and done, the beef industry itself will determine the final impact of the grading changes on the marketing system, hence on the consumer.

Meatier cattle. From the cattle industry's viewpoint, the new grading standards will encourage production of "meat type" livestock that can be raised and marketed more efficiently than in the past.

In the Nebraska study the animals were slaughtered at three ages (424 days, 458, or 491). Feeding to ages beyond 424 days did not significantly change the taste panel's scores for tenderness, flavor, juiciness, or overall acceptability. But, between 424 and 491 days, the percentage of fat trim grew 4 percent, and the percentage of retail product in the carcass decreased 3 percent.

"This represents a tremendous cost," the study said, "both to the producer and consumer when cattle are fed longer, especially because a large percentage of feed is converted to fat as animals become older. Using both the quality and yield grades—as the new grading system does—is a necessary step to shift the economic emphasis to carcass yield."

Breeding a winner. Cattlemen will be taking a hard look at their breeding programs as a result of the revised grading standards.

The steers evaluated in the taste test were from Hereford and Angus cows artificially mated to seven breeds of bulls: Hereford, Angus, Charolais, Jersey, South Devon, Simmental, and Limousin.

The percentage of carcasses graded Choice or better rose for all breeds under the new standards. On the average, 68 percent graded at least Choice under the new standards against 58 percent under the old.

But some of the crosses departed from the average by quite a margin. Carcasses of steers from Jersey sires showed the greatest increase in number graded Choice or better—67 percent under the old standards and 90 percent under the new. Carcasses from Angus sired steers showed the least increase among the seven crosses, going from 76 percent to 82 percent.

More carcasses rate Standard. The narrowing of the marbling requirements of the Good grade, and removal of conformation as a grading requirement, contributed to the larger number of carcasses graded Standard for all breeds of sire. However, this was especially evident for Hereford and the faster growing, later maturing breeds—Charolais, Simmental, and Limousin.

[Based on "The New Beef Carcass Quality Grade Standards: What the Changes Mean," article in *Livestock and Meat Situation,* LMS-208, April 1976, by Virden L. Harrison, Commodity Economics Division, and Dennis R. Campion, Agricultural Research Service.]

What's the Difference ?

In brief, here is how the new beef grade standards differ from the old:

- They make it possible for slightly leaner beef to qualify for the Prime and Choice grades.
- They establish a more restrictive Good grade.
- They increase the uniformity in eating characteristics in each grade.
- They require that all beef graded be identified for both quality and yield—the percentage of retail cuts derived from the carcass.

The last point in particular will have significance to the consumer. Applying a yield grade to all graded carcasses should prompt cattlemen to produce thickly muscled, high quality beef but with little excess fat.

The yield grades themselves are numbered 1 through 5. They measure the percentage of trimmed retail cuts a carcass will produce. By contrast, the quality of grades—Prime, Choice, Good, etc.—measure physical characteristics having to do with palatability (tenderness, juiciness, and flavor) and are based mainly on marbling and maturity.

Conformation was deleted as a quality factor in the revised standards because it has no effect on beef's palatability. Conformation does affect the retail value of the carcass but its contribution is reflected more accurately by the yield grade.

The change in marbling and maturity relationships should produce greater uniformity within each of the grades. Under the old standards, increases in marbling were required within each grade to compensate for increases in maturity. Now, increases in marbling within each grade will be required only for beef from older cattle—those over approximately 30 months of age. However, the changes in marbling/maturity relationships in the Prime and Choice grades will not measurably affect the eating quality.

Consumers wanting beef that's leaner than Choice or Prime might opt for the Good grade. Beef in this class is now judged by more restrictive marbling criteria than under the old standards, resulting in a product that's more uniform and more consistent in palatability. Slightly more marbling is required than previously.

USDA Good grade beef could become more available if there is consumer and retailer demand for grade identification on this quality of beef. Also, it can be produced at a slightly lower cost than the Prime and Choice grades.

[Based on special material from the Agricultural Marketing Service.]

Recent Publications

Single copies of the publications listed here are available free from The Farm Index, Economic Research Service, Rm. 1664–So., U.S. Department of Agriculture, Washington, D.C. 20250. However, publications indicated by (*) may be obtained only by writing to the experiment station or university. For addresses, see July and December issues of The Farm Index.

Estimated Sale and Impact of Soy-Beef Blends in Grocery Stores. William W. Gallimore, National Economic Analysis Division. NFS-155 Reprint.

A sample of retail store sales showed soy-beef blends averaged about 19 cents per pound less than regular ground beef during 1973-74 and that consumers purchased considerable quantities at these differentials. Followup data showed that sales fell off as beef prices eased in late 1975.

Distribution Patterns for U.S. Rice, 1973/74. Shelby Holder, Alberta Smith, and J. C. Eiland, Commodity Economics Division. ERS-624.

Based on a mail survey of all known rice millers and repackagers, this study analyzes rice distribution patterns for marketing year 1973/74. Data breakdowns include distribution by type of outlet, region and State, rice type, and package size.

Agricultural Finance Review. Economic Research Service. Vol. 36.

An annual publication, the *Review* presents a collection of articles in a nontechnical format. The articles report on concepts and research in a broad range of agricultural finance issues that relate to farm and rural finance; financial management and firm growth strategies; insurance; income; farm supply, processing, and distribution industries; financial institutions; taxation; rural economic development; and the organization of agricultural production.

Farm Real Estate Taxes: Recent Trends and Developments. Mary L. Bailey, National Economic Analysis Division. RET-15.

According to this publication, farm real estate taxes in the U.S. reached $2.58 billion in 1974, an increase of 5.5 percent over 1973. Taxes per acre went up 14 cents. The tax hikes were in response to rising costs of financing State and local governments.

The Agricultural Situation in Western Europe : Review of 1975 and Outlook for 1976. Foreign Demand and Competition Division. FAER-119.

A poor grain harvest was the big factor in depressing Western Europe's agricultural output in 1975. But large grain carryover stocks softened the impact, this study notes. This year, crop production is expected to return to normal, while the oversupply of beef will ease some, but dairy surpluses will remain a problem. U.S. farm exports to the area should pick up, though, as the continent's economy continues to brighten.

Evaluation of Pesticide Supplies and Demand for 1976. Paul A. Andrilenas and Theodore R. Eichers, National Economic Analysis Division. AER-332.

Pesticide supplies for 1976 are ample for nearly all products, this report concludes. Production is up 10-15 percent over last year, and supplies have increased even more because of substantial gains in beginning-year inventories. Pricewise, dealers are paying slightly more for pesticides than they did last season, but grower prices are about the same or even slightly less.

Supplement for 1976 to Statistics on Cotton and Related Data, 1920-73. Commodity Economics Division. Supl. Statis. Bul. 535.

This supplement begins the first of an annual update to a prior bulletin covering 53 years of cotton statistics. It also provides a quick reference for data used in ERS's *Cotton and Wool Situation,* which comes out five times a year.

Dynamics of Land Use in Fast Growth Areas. Kathryn A. Zeimetz, Elizabeth Dillon, Ernest E. Hardy, and Robert C. Otte, Natural Resource Economics Division. AER-325.

Land use patterns and changes during 1961-70 are interpreted from Agricultural Stabilization and Conservation Service (ASCS) scale photographs for 53 rapid-growth counties. These counties alone accounted for about 20 percent of the overall U.S. population increase during the sixties. Urban sprawl took in 3 percent more of the counties' land, reaching a total share of 16 percent in 1970.

Treatment of Hedging in Commodity Market Regulation. Allen B. Paul, National Economic Analysis Division. Tech. Bul. 1538.

The study analyzes the reasons for defining bona fide hedging for regulatory purposes, deficiencies of the current legal definitions, means for sidestepping the need to define hedging, how these means might work in practice, some problems posed thereby, and possible theoretical and practical bases for improved definitions.

Mozambique's Agricultural Economy in Brief. Herbert H. Steiner, Foreign Demand and Competition Division. FAER-116.

This report summarizes the history and geography of Mozambique as well as capsulizing the country's agriculture—the livelihood of the majority of its people.

Balance Sheet of the Farming Sector, 1975—Supplement I to AIB-389. Carson D. Evans and Richard W. Simunek, National Economic Analysis Divison.

On January 1, 1976, the farm balance sheet looked like this: farm assets, $590 billion; debts, $91 billion; proprietors' equities, $499 billion. This report analyzes the ups and downs from a year earlier of the various factors going into the balance sheet.

Economic Trends

Item	Unit or Base Period	1967	1975 Year	1976 April	1976 Feb.	1976 March	1976 April
Prices:							
Prices received by farmers	1967=100	—	181	170	187	184	188
Crops	1967=100	—	194	188	190	192	191
Livestock and products	1967=100	—	172	157	185	179	187
Prices paid, interest, taxes and wage rates	1967=100	—	185	182	193	194	194
Family living items	1967=100	—	177	173	183	184	184
Production items	1967=100	—	188	185	194	196	195
Ratio[1]	1967=100	—	98	93	97	95	97
Wholesale prices, all commodities	1967=100	—	174.9	172.1	179.4	179.8	—
Industrial commodities	1967=100	—	171.5	169.7	178.1	179.1	—
Farm products	1967=100	—	186.7	177.7	191.0	187.2	—
Processed foods and feeds	1967=100	—	182.6	179.4	176.4	175.8	—
Consumer price index, all items	1967=100	—	161.2	158.6	167.1	167.5	—
Food	1967=100	—	175.4	171.2	180.0	178.7	—
Farm Food Market Basket: [2]							
Retail cost	1967=100	—	173.6	168.2	176.9	174.8	—
Farm value	1967=100	—	187.1	176.4	183.5	180.2	—
Farm-retail spread	1967=100	—	165.1	163.0	172.7	171.4	—
Farmers' share of retail cost	Percent	—	42	41	40	40	—
Farm Income: [3]							
Volume of farm marketings	1967=100	—	115	—	93	95	—
Cash receipts from farm marketings	Million dollars	42,817	90,572	—	6,097	6,200	—
Crops	Million dollars	18,434	47,327	—	2,371	2,100	—
Livestock and products	Million dollars	24,383	43,245	—	3,726	4,000	—
Realized gross income [4]	Billion dollars	49.9	99.2	—	—	100.0	—
Farm production expenses [4]	Billion dollars	38.2	75.5	—	—	78.0	—
Realized net income [4]	Billion dollars	11.7	23.7	—	—	22.0	—
Agricultural Trade:							
Agricultural exports	Million dollars	—	21,894	1,758	1,715	1,873	—
Agricultural imports	Million dollars	—	4,295	762	769	960	—
Land Values:							
Average value per acre	Dollars	[6]168	[7]354	—	—	—	[8]381
Total value of farm real estate	Billion dollars	[6]181.9	[7]370	—	—	—	[8]398
Gross National Product: [4]	Billion dollars	796.3	1,498.9	—	—	1,616.3	—
Consumption	Billion dollars	490.4	963.8	—	—	1,028.7	—
Investment	Billion dollars	120.8	182.6	—	—	229.6	—
Government expenditures	Billion dollars	180.2	331.2	—	—	348.4	—
Net exports	Billion dollars	4.9	21.3	—	—	9.7	—
Income and Spending: [5]							
Personal income, annual rate	Billion dollars	626.6	1,245.9	1,209.0	1,325.9	1,333.5	—
Total retail sales, monthly rate	Million dollars	26,151	48,702	46,813	52,414	53,869	—
Retail sales of food group, monthly rate	Million dollars	5,759	10,977	10,598	11,402	11,809	—
Employment and Wages: [5]							
Total civilian employment	Millions	74.4	[9]84.8	[9]84.3	[9]86.3	[9]86.7	[9]—
Agricultural	Millions	3.8	[9]3.4	[9]3.3	[9]3.2	[9]3.2	[9]—
Rate of unemployment	Percent	3.8	8.5	8.6	7.6	7.5	—
Workweek in manufacturing	Hours	40.6	39.1	39.1	40.4	40.2	—
Hourly earnings in manufacturing, unadjusted	Dollars	2.83	4.81	4.73	5.04	5.07	—
Industrial Production: [5]	1967=100	—	114	110	120	121	—
Manufacturers' Shipments and Inventories: [5]							
Total shipments, monthly rate	Million dollars	46,449	82,724	80,703	90,912	92,782	—
Total inventories, book value end of month	Million dollars	84,655	146,574	150,184	147,328	148,090	—
Total new orders, monthly rate	Million dollars	46,763	81,351	78,008	90,243	93,366	—

[1]Ratio of index of prices received by farmers to index of prices paid, interest, taxes, and farm wage rates. [2]Average annual quantities of farm food products purchased by urban wage earner and clerical worker households (including those of single workers living alone) in 1959-61—estimated monthly. [3]Annual and quarterly data are on 50-State basis. [4]Annual rates seasonally adjusted first quarter. [5]Seasonally adjusted. [6]As of March 1, 1967. [7]As of March 1, 1975. [8]As of November 1, 1975. [9]Beginning January 1972 data not strictly comparable with prior data because of adjustment to 1970 Census data.

Source: U.S. Dept. of Agriculture (Agricultural Prices, Foreign Agricultural Trade and Farm Real Estate Market Developments); U.S. Dept. of Commerce (Current Industrial Reports, Business News Reports, Monthly Retail Trade Report and Survey of Current Business); and U.S. Dept. of Labor.

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